

THE ARTHROPOD FAUNA OF CONIFEROUS LEADERS
WEEVILED BY *PISSODES STROBI* (PECK).¹

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An interesting feature of a study of the bionomics of the white pine weevil, *Pissodes strobi* (Peck), is the varied fauna found associated with it under the same general ecological conditions. Many of these forms bear the very definite relationship of parasite and host or predator and prey, but there remains a number of coexistent species which show no obvious connection with the weevil. This paper deals with the latter group.

In the course of dissecting a large number of the weeviled terminal shoots of the white pine, *Pinus strobus*, Scotch pine, *P. sylvestris*, and Norway spruce, *Picea excelsa*, but principally while breeding out parasitic forms, an incidental series of 90 spiders, mites and insects was obtained. The majority of the miscellany treated herein represent the captures on or near a scrim screen in the window of a room in which 2602 leaders weeviled the previous summer were confined. The primary purpose of this breeding room was to obtain a large number of the insect parasites of *Pissodes* with a minimum of labor and breeding apparatus. Most of the fauna from this room were taken under conditions which, perhaps, do not establish conclusively that they were from the shoots, but it may be said that the breeding room was empty, except for the shoots, and all doors and cracks were sealed with gummed paper strips. It was, in general, made tight to prevent the escape of the desired parasites. It would seem, at least where species were numerous, that origin in the leaders is indicated. Fauna obtained from smaller cages, with no possibility of other origin, are noted as from localities other than Massachusetts.

This list is presented for what value and interest it may be worth. All specific determinations were made by specialists in the various groups. The following key will show by whom the determination was made, the abbreviation being enclosed in brackets in each case after the specific name.

¹Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 301.

A—J. M. Aldrich	F—C. A. Frost
B1—M. W. Blackman	H—Carl Heinrich
Bu—August Busck	J—C. W. Johnson
C—E. A. Chapin	R—S. A. Rohwer
Em—J. H. Emerton	S—Grace Sandhouse
Ew—H. E. Ewing	

Grateful acknowledgement is hereby made to these authorities for their kindness, and to Mr. H. J. MacAloney and Dr. T. C. Barnes for permission to incorporate a part of their unpublished lists of incidental fauna from the same type of material, twelve and two species respectively. Species bred out by these investigators will be so noted. All localities, if not otherwise stated, are Boston, Mass. and environs.

It should be made clear that the following several classes are definitely *excluded* from this list:

1. All parasitic Hymenoptera, whether parasites of *Pissodes strobi* or otherwise.

2. Several predacious Clerids, one fly definitely known to be connected with the white pine weevil, one fly erroneously connected with the weevil in the literature, and one lepidopteron which is facultatively predacious upon *Pissodes*. These two classes are reserved for another and more extended paper.

3. All insects known to work in these leaders but not obtained, *e. g.*, the pine tip moth, *Rhyacionia frustrana*, the pine-bark aphid, *Adelges pinicorticis*, *A. pinifoliae*, *Pissodes affinis*, *P. approximatus*, *Hylobius pales*, *et al.* The white pine weevil, itself, was not obtained from the breeding room or the cages, although rarely, living adults may emerge after hibernation in the pupal cell.

It is realized that this miscellany is not a complete list of the arthropods associated with weeviled leaders, but it is believed that it comprises a fair representation of those forms which more or less regularly live or hibernate in such shoots.

CLASS ARACHNIDA

In the opinion of Mr. J. H. Emerton, all of the following spiders, except *Agelena navia*, were very probably from no source

other than the leaders. There can be no question in the case of *Theridion murarium*, as it has often been dissected out of the leaders in the fall. Mr. Emerton states that no place of hibernation for this species has been reported previously. The indications are that this spider invades empty weevil pupal cells in the fall for shelter only.

Order ARANEAE

Family Dictynidae

Dictyna muraria Em. [Em.] Late March, April. A few half-grown.

Family Theridiidae

Theridion frondeum Htz. [Em.] April. 2 young:

T. murarium Em. [Em.] April. Abundant, all half-grown.

Family Linyphiidae

Tmeticus bostoniensis Em. [Em.] April. 1 female adult.

Family Argiopidae (*Epeiridae*)

Epeira displicata Htz. [Em.] April. Common, all young.

E. patigiata Em. [Em.] May. Several, all young.

Family Thomisidae

Philodromus sp. [Em.] April. 1 young.

P. sp. [Em.] April. 2 young.

Family Clubionidae

Clubiona abboti L. Koch. [Em.] April. 1 female adult.

Family Agelenidae

Agelena naevia Walek. [Em.] April. 1 very young.

Family Salticidae

Mavia vittata Htz. [Em.] May. 1 very young.

Tutelina (Icius) elegans Htz. [Em.] May. 1 very young.

Wala mitrata Htz. [Em.] April. 1 very young.

W. palmarum Htz. [Em.] April. 1 very young.

Order ACARINA

Family Tarsonemidae

Pediculoides ventricosus Newport. In frass under bark, spring and fall. Rare to abundant. Predacious on variety of larvæ in shoot; of no particular effect on *Pissodes strobi*, but highly destructive to insect cultures reared in the laboratory.

Family *Tyroglyphidæ* [Ew.]

Migratory, non-parasitic nymphs, or hypopi, of this family very common in frass and on a wide variety of insects. Particularly abundant in material from Ohio and New Hampshire. June, July.

CLASS INSECTA

Order CORRODENTIA

Family *Psocidæ*

Psocus sp. [J.] July. 19.

Order HEMIPTERA

Family *Miridæ*

Deracoris pæcilus McAtce. [J.] May. 2.

Phytocoris eximius Reut. [J.] June. 1. Also Sizerville, Pa. July. 1.

Order HOMOPTERA

Family *Chermidæ*

Psylla sp. [J.] May. 2.

Order COLEOPTERA

Mr. C. A. Frost has stated that it is remarkable that so many of the species listed below are "scavengers or inclined that way." He adds that he believes it very likely that (of the earlier forms) *Attagenus*, which was abundant, *Laricobius*, a rare form, possibly *Cryptophagus*, and *Glischrochilus*, regularly hibernant in white pine shoots. The occurrence of *Ptinus fur*, however, he considers unusual and yet it occurred in significant numbers. The striking abundance of *Galerucella luteola*, the elm leaf beetle, seems worthy of note.

Family *Carabidæ*

Stenolophus conjunctus (Say). [F.] Early May. 1.

Family *Histeridæ*

Carcinops quatuordecimstriata Steph. [F.] May. 1.

Family *Cleridæ*

Thanasimus dubius (Fab.). [F.] Sept. 1.

Hydnocera unifasciata Say. [C.] June, July. 12.

Phyllobænus dislocatus Say. [C.] June, July. 18.

Three species omitted.

Family *Dermestidæ*

Attagenus pelli Linn. [F.] May. 26.

Trogoderma ornata Say. [C.] June. 1.

Anihrenus scrophulariæ (Linn.). [F. & C.] The carpet beetle
May, June. 3.

A. verbasci (Linn.) [C.] July. 1.

Family *Ostomidæ*

Tenebroides corticalis (Melsh.). [F.] Late May. 1.

Family *Nitidulidæ*

Glischrochilus fasciatus (Oliv.). [F.] April. 1.

Family *Derodontidæ*

Laribobius erichsoni Rosenh. [F.] April. 1.

Family *Cryptophagidæ*

Cryptophilus integer (Heer.) [F.] Readfield, Me. Sept. 1.

Cryptophagus acutangulus Gyll. [F.] May. 4. Also Durham,
N. H., Roscommon, Mich.

C. sp. [F.] Late May. 1.

Atomaria sp. [F.] Concord, N. H. Early June. 1.

Family *Coccinellidæ*

Scymnus punctatus Melsh. [F.] Late May. 1.

Family *Alleculidæ*

Hymenorus sp. [C.] July. 1.

Family *Tenebrionidæ*

Tenebrio obscurus Fab. [C.] July. 1.

Family *Melandryidæ*

Canifa pallipes (Melsh.) [F.] Late May. 3.

Family *Ptinidæ*

Ptinus fur Linn. [F. & C.] April to June. 18.

Family *Anobiidæ*

Sitodrepa panicea (Linn.). [C.] The drug-store beetle. July. 1.

Calostethus notatus (Say). [F.] April, May. 3.

Family *Scarabeidæ*

Trox scaber (Linn.). [C.] July. 1.

Phyllophaga fusca (Froelich). [F.] May. 1.

Family *Cerambycidæ*

Pogonocherus tomentosus Hald. [F.] Readfield, Me. Sept. 1.

Family *Chrysomelidæ*

Galerucella luteola Mull. (*xanthomelæna* Schrank). [F.] The elm-leaf beetle. May, early June. 165.

Family *Curculionidæ*

Magdalis perforata Horn. [F.] Mont Alto, Pa. June. 1.

Family *Scolytidæ*

Pityophthorus cariniceps Lec. [Bl.] May. 1.

P. puberulus Lec. [Swaine.] Bred by Barnes. N. Y.

Order LEPIDOPTERA

Family *Tineidæ*

Tinea sp. [Bu.] June. 1. Not a pine feeder.

Family *Tischeridæ*

Tischeria sp. [Bu.] June. 1. Not a pine feeder.

Family *Lyonetiidæ*

Bucculatrix sp. [Bu.] June. 1. Not a pine species.

Family *Gracelariidæ*

Lithocolletis ostensackenella Fitch. [Bu.] June. 1. Feeds on *Robinia*.

Family *Heliozelidæ*

Agonopteryx (Depressaria) atrodorsella Clem. [J.] April. Common.

Family *Gelechiidæ*

Eucordylea atrupictella Dietz. [Bu.] Bred by MacAloney, Petersham, Mass.

Paralechia pinifoliella Kearf. [Bu.] June. 1. The pine-leaf miner.

Recurvaria piceaella Kearf. [Bu.] June. 1.

Family *Tortricidæ*

Laspeyresia youngana Kearf. [H.] June. 7.

Taniva albolineana Kearf. (var. of *Peronea hastiana* Linn.?) [H.] June. 1.

Family *Pyalidæ*

Canarsia ulmiarrosorella Clem. [H.] June. 3. Not a pine insect; feeds on elm.

Dioryctria abietella Fab. [A.] Bred by MacAloney, Petersham, Mass.

One species omitted.

Order DIPTERA

Family *Trichoceridae*

Trichocera brumalis Fitch. [J.] April. 1.

Family *Chironomidae*

Forcipomyia specularis Coq. [A.] Bred by MacAloney, Petersham, Mass.

Family *Cecidomyiidae*

Lestodiplosis iridipennis Johnson. [J.] Oneonta, N. Y. June. 2.

Family *Sciaridae*

Sciara sp. [J.] May. Abundant. Also Oneonta, N. Y., Ansonia, Pa., Sizerville, Pa., Milroy, Pa., Durham, N. H. and Roscommon, Mich.

Family *Scutopsidae*

Reichertella femoralis (Mg.). [J.] May, June. Common. Also Oneonta, N. Y., McConnellsburg, Pa., Sizerville, Pa., Milroy, Pa., Fayetteville, Pa., Concord, N. H.

Family *Scenopinidae*

Scenopinus fenestralis Linn. [J. & A.] June, July. 4.

S. glabrifrons Mg. [J.] Late June. 1.

Family *Dolichopodidae*

Medeterus sp. [J.] June. 1.

Family *Empididae*

Tachydromia sp. Bred by MacAloney, Petersham, Mass.

Family *Phoridae*

Megaselida (Aphiochaeta) rufipes Mg. [J.] May. 3.

Family *Tachinidae*

Chaetotachina simulans Mg. [J.] June. 1. Mr. C. W. Johnson believes this form to be parasitic upon sawflies, of which a number invade the pupal cells of *Pissodes* to hibernate.

One species omitted.

Family *Calliphoridae*

Calliphora erythrocephala Mg. [J.] May. 1.

Family *Muscidae*

Muscina stabulans Fall. [A.] The common stable fly. Bred by MacAloney, Petersham, Mass.

Family *Borboridae*

Leptocera sp. [A.] Bred by MacAloney, Petersham, Mass.

Family *Sapromyzidæ*

Sapromyza rotundicornis Lw. [A.] Durham, N. H. June. 2.

Family *Lonchæidæ*

One species omitted.

Family *Chloropidæ*

Gaurax apicalis Mall. [Malloch.] Bred by MacAloney, Petersham, Mass.

G. festiva Lw. [J.] Oneonta, N. Y. July. 2.

G. sp. [J.] May. 1.

Hippelates sp. Bred by MacAloney, Petersham, Mass.

Madiza glabra [A.] Bred by MacAloney, Petersham, Mass.

Botanobia (Oscinella) coxendi Fitch. [A.] Bred by MacAloney, Petersham, Mass.

B. frit Linn. [J.] Late May. 9. Also Concord, N. H., Mont Alto, Pa., Northwestern Ct., and Oneonta, N. Y.

Family *Drosophilidæ*

Chymomyza amæna Lw. [A.] Bred by MacAloney, Petersham, Mass.

Drosophila funebris Fab. [J.] May. 6.

Scaptomyza graminum Fall. [A.] Ann Arbor, Mich. June, July. 27.

Family *Milichiidæ*

Desmometopa latipes Mg. [A.] July. 1.

Family *Ochthiphilidæ*

Leucopis simplex Lw. [J.] Common. Also China, Me., McConnellsburg, Pa.

Order HYMENOPTERA

Family *Tenthredinidæ*

Dr. Rohwer has written in reference to the following sawflies: "Not any of these species feed on pines. They feed in the larval stage on herbaceous shrubs, and were using the burrows of *Pissodes* only as places to hibernate."

Ametastegia glabrata (Fall.). [R.] Late May. 1 male.

Emphytus mellipes Nort. [R.] May, early June. 6 males, 4 females.

Emphytina aperta (Nort.). [R.] Readfield, Me. June. 1 male; Concord, N. H. Early June 1 male.

E. tener (Fall.). [R.] May. 2 males, 3 females; Fayetteville, Pa. Late May, 1 female; Ansonia, Pa. May. 1 female.

Hemitaxonus dubitatus (Nort.). [R.] Late May. 1 male.

Strongylogaster soriculatipes Cress. [R.] June. 1 female.

Pontania sp. [R.] June. 1 female.

The parasitic families *Braconidæ*, *Ichneumonidæ*, *Ceraphronidæ*, *Diapriidæ*, *Cynipidæ*, *Chalcididæ*, *Eurytomidæ*, *Eupelmidæ*, *Pteromalidæ* and *Eulophidæ*, of which a number of species were obtained, are omitted.

Family *Vespidæ*

Ancistrocerus tigris (Suass.). [J.] June. 1.

Family *Sphecidæ*

Trypoxylon frigidum Sm. [R.] Bred by Barnes. N. Y.

Stigmus fraternus Say (?) [S.] June. 1.

Pemphredon (Diphlebus) sp. [S.] June 5. Also Sidney and Readfield, Me. July.

Passalæcus annulatus Say (?) [S.] June. 1.

P. sp. [S.] June. 1.

Xylocelia sp. [S.] June. 1.

Family *Hylæidæ*

Hylæus sp. Bred by MacAloney, Petersham, Mass.